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**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
END SEMESTER, JUNE-2021**

Course: Theory of plates & Shells
Program: M. Tech (Structures)
Course Code: CIVL 7012
Instructions: Attempt all the questions

Semester: II
Time: 3Hrs
Max. Marks: 100

SECTION A

S. No.		Marks	CO
Q.1	Briefly explain the deflection profile of rectangular loaded plates.	5	CO1
Q.2	Write max deflections & stress produced in cylindrical plates with clamped edges	5	CO2
Q.3	Briefly explain membrane theory of shells.	5	CO3
Q.4	Write equations of equilibrium of shells.	5	CO3
Q.5	How do you classify shells into long and short shells as per various theories?	5	CO4
Q.6	Write a short note on shells on revolutions.	5	CO4

SECTION B

Q.7	Derive the expression for Bending moment & curvature in pure bending of plates	10	CO1
Q.8	Derive the differential equation for deflection for the symmetrical bending of a circular plate with lateral loads of the type $\frac{d^3w}{dr^3} + \frac{1}{r} \frac{d^2w}{dr^2} - \frac{1}{r^2} \frac{dw}{dr} = \frac{q}{D}$ where Q= shear force, q = Intensity of loading, r = radius of plate, D = flexural rigidity of plate	10	CO2
Q.9	A cylindrical shell subject to UDL (Self-weight + imposed load). Derive the expression for N_θ, N_x & $N_{x\theta}$	10	CO3
Q.10	Calculate the membrane stress at central span, quarter span & end section for a cylindrical shell of 20m span, 10m radius & semi vertex angle 45° . Shell is 90mm thick & subjected to all-inclusive UDL of 2.5 kN/m^2	10	CO4
Q. 11	Derive the expression for equations of equilibrium of a shell	10	CO3

SECTION-C

Q.12	A spherical dome of 15m radius & rise 4m carries an all-inclusive load of 3 kN/m^2 . Calculate the various stresses developed in the shells due to this load. OR Derive expressions for deflection, shear force and bending moment for a circular plate with simply supported boundary conditions subjected to uniformly distributed loading.	20	CO2
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